



Locus of control and cell phone use: Implications for sleep quality, academic performance, and subjective well-being



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ABSTRACT

This study centers on the following hypothesis: that individuals with an external locus of control, in comparison to individuals with an internal locus of control, have less control over their cell phone use (i.e., more likely to use at bedtime; more likely to use in class and while studying) and are consequently more vulnerable to the negative outcomes associated with excessive cell phone use (i.e., poor sleep quality, reduced academic performance, and reduced subjective well-being). *Methods:* Undergraduate college students ($N = 516$) participated in the study by completing validated surveys assessing their cell phone use, locus of control, sleep quality, academic performance, and subjective well-being. A path model was used to examine how locus of control relates to students' cell phone use and the key outcome variables. *Results:* The model exhibited reasonable model fit with all paths being statistically significant and in the hypothesized direction. *Conclusion:* By enabling an individual to better control cell phone use at inopportune times, a greater internal locus of control may mitigate some of the negative outcomes associated with high frequency cell phone use; conversely, an individual with a greater external locus of control may have difficulty controlling use at inopportune times and the negative effects associated with high frequency use may be exacerbated.

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1. Introduction

The cellular telephone (i.e., mobile phone, smartphone and hereafter cell phone) is central to young people's lives. The device is a primary hub for two-way communication (calling, texting, email, etc.), online social networking, leisure time entertainment, information gathering, and data management pertinent to daily life. For this reason, many young people use the cell phone throughout the day and increasingly describe it as something they cannot live without (Pew Research, 2014). Yet, research has emerged identifying multiple negative outcomes associated with excessive daily cell phone use. Negative outcomes include *reduced academic performance* (Dietz & Henrich, 2014; Jacobsen & Forste, 2011; Junco & Cotton, 2012; Lepp, Barkley, & Karpinski, 2014, 2015; Rosen, Carrier, & Cheever, 2013; Wei, Wang, & Klausner, 2012; Wood et al., 2012), *poor sleep quality* (Fossum, Nordness, Storemark, Bjorvatn, & Pallesen, 2014; Lanaj, Johnson, & Barnes, 2014; Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann, & Grob, 2015; Munezawa et al., 2011; Murdock, 2013; Thomée, Härenstam, & Hagberg, 2011), *decreased mental health* (Beranuy,

Oberst, Carbonell, & Chamarro, 2009; Harwood, Dooley, Scott, & Joiner, 2014; Jenaro, Flores, Gómez-Vela, González-Gil, & Caballo, 2007; Lepp et al., 2014; Rosen et al., 2014), *increased sedentary behavior, decreased cardiorespiratory fitness and decreased intensity of planned exercise* (Barkley, Lepp, & Salehi-Esfahani, 2015; Lepp, Barkley, Sanders, Rebold, & Gates, 2013; Rebold, Lepp, Sanders, & Barkley, 2015), and *decreased life satisfaction* (Lepp et al., 2014). As these relationships become more clear, it is important to explore the psychology behind them. Of particular interest to this study is an individual's locus of control (Johnson, Rosen, Chang, & Lin, 2015; Rotter, 1966). Briefly, locus of control describes an individual's beliefs about their ability to control the environment as well as the outcomes of their behavior. Individuals with a greater *internal* locus of control tend to believe that control is centered within themselves; conversely, individuals with a greater *external* locus of control tend to believe that control is centered outside of themselves and are therefore more likely to attribute behavioral outcomes to environmental influences. Given that the cell phone is a prominent feature of the modern environment, it is worth examining how locus of control may be associated with cell phone use and associated outcomes. Considering the current research, we hypothesize that individuals with an external locus of control, in comparison to individuals with an internal locus of control, have less control over their cell phone use and are consequently more

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vulnerable to the aforementioned negative outcomes associated with excessive cell phone use. To put this in less formal terms, we are suggesting that individuals with an external locus of control have surrendered some control over their environment and behavioral outcomes to their cell phone. Testing this idea enabled us to develop a model describing the relationship between young people's cell phone use and important behavioral outcomes (academic performance, sleep quality, and subjective well-being) and the role locus of control plays in the relationship.

2. Literature review

Locus of control is an individual's evaluation of their environment and how responsive the environment is to their actions (Johnson et al., 2015; Rotter, 1966). Individuals with a greater internal locus of control (henceforth "internals") tend to believe that the environment is responsive to their actions and that interaction with the environment will produce predictable outcomes. Conversely, individuals with a greater external locus of control (henceforth "externals") tend to interpret the environment and the outcomes produced through interaction with the environment as beyond their control. Because computers and related "smart" devices like cell phones and tablets are an increasingly prominent fixture in the modern environment, locus of control may help us understand who can control their use of these devices in environments and circumstances where it is important to do so (e.g., classroom, study hall, bedroom, fitness center, while driving, etc.).

Research investigating locus of control and computer behavior is limited and results are mixed. Two independent studies found that externals were more likely to abuse the internet at work and "cyberloaf" (i.e., use work time for personal computing needs such as online shopping) (Blanchard & Henle, 2008; Chen, Ross, & Yang, 2011). To explain, externals believe that the outcomes of internet abuse at work are more likely determined by chance than by personal agency; therefore, they exercise less control over their behavior. Such an outlook has been associated with internet addiction as well (Chak & Leung, 2004). In another study of computer behavior at work, an external locus of control was associated with a decreased ability to deal with distractions in general, yet it was not associated with workers' perceptions of a very specific work distraction – e-mail (Hair, Renaud, & Ramsay, 2007). Finally, research with college students has found that intention for playing online games as well as preference for online social interaction is greater in externals than internals (Koo, 2009; Ye & Lin, 2015). Results from both studies suggest that internals perceive greater control over the online environment and therefore, better regulate their online behavior.

Research examining locus of control and cell phone use is even more limited. Our review of the literature identified three relevant studies. The first, a study by Mahatanakoon and O'Sullivan (2008), found an internal locus of control was associated with more positive attitudes about text messaging. A second study found that an internal locus of control was associated with greater smartphone dependency (Park, Kim, Shon, & Shim, 2013). Both results suggest that internals may use the cell phone more strategically because they understand its broad functionality (e.g., information gathering, data management, scheduling, etc.) as something which allows them to better control life's events for their advantage. This in turn, may lead internals to feel more dependent on the device. Park et al. (2013) clearly distinguish cell phone dependency from cell phone addiction; clarifying that addiction suggests that control over the cell phone has been lost and use occurs at the expense of important life outcomes. In support of this, research suggests that internals are less likely than externals to be compulsive smartphone users and less compulsive use was associated with less "technostress"

(i.e., "inability to cope with the new computer technologies", p. 373) (Lee, Chang, Lin, & Cheng, 2014).

Given this research, locus of control appears to be a promising yet understudied variable for better understanding the relationship between cell phone use and behavioral outcomes. Recently, research has linked high frequency cell phone use with the following outcomes: *reduced academic performance* (Dietz & Henrich, 2014; Jacobsen & Forste, 2011; Junco & Cotton, 2012; Lepp et al., 2014, 2015; Rosen et al., 2013; Wei et al., 2012; Wood et al., 2012), *poor sleep quality* (Fossum et al., 2014; Lanaj et al., 2014; Lemola et al., 2015; Munezawa et al., 2011; Murdock, 2013; Thomée et al., 2011), *decreased mental health* (Beranuy et al., 2009; Harwood et al., 2014; Jenaro et al., 2007; Lepp et al., 2014; Rosen et al., 2014), *increased sedentary behavior, decreased cardiorespiratory fitness and decreased intensity of planned exercise* (Barkley et al., 2015; Lepp et al., 2013; Rebold et al., 2015), and *decreased life satisfaction* (Lepp et al., 2014). Yet, it may be that an internal locus of control could mitigate some of the negative outcomes associated with high frequency use. Thus, internals may use the phone as often as desired as long as it was not contributing to negative outcomes. Furthermore, internals should be able to control their use in circumstances where it is important to do so. By the same logic, externals would have greater difficulty controlling cell phone use at inopportune times and the negative effects associated with high frequency use would be exacerbated.

Given the reasoning above, the purpose of this study was to test the relationship between locus of control, total cell phone use and cell phone use at inopportune times with a series of behavioral outcomes in a group of college students. The integrated model presented in Fig. 1 was used for this purpose. Path analysis simultaneously tested the model's multiple hypotheses:

- H₁ & H₂: Total daily cell phone use (Total_CP) is positively related to cell phone use at bedtime (CP_Night) and cell phone use during class/while studying (CP_Class);
- H₃ & H₄: An internal locus of control (LOC) is negatively related to cell phone use at bed time and during class/while studying (CP_Night and CP_Class);
- H₅ & H₆: Cell phone use at bedtime (CP_Night) is positively and internal locus of control (LOC) is negatively related with reduced sleep quality (PSQI);
- H₇ & H₈: Cell phone use in class/while studying (CP_Class) is negatively and internal locus of control (LOC) is positively related to academic performance (GPA); and
- H₉, H₁₀ & H₁₁: The increased degree of poor sleep (PSQI) is negatively, high academic performance (GPA) is positively, and internal locus of control (LOC) is positively related with subjective well-being (SWL).

Sleep quality and academic performance were chosen as the model's initial outcome variables because it was possible to design survey questions assessing cell phone use at bedtime (which would presumably be related to sleep quality: e.g., Lanaj et al., 2014) and in class/while studying (which would presumably be related to academic performance: e.g., Dietz & Henrich, 2014). Subjective well-being was chosen as the model's final outcome variable because previous research suggests its relationship with cell phone use is mediated by academic performance (Lepp et al., 2014). In addition, we do not anticipate total daily cell phone use to be associated with locus of control in the preliminary correlation analysis as research suggests both internals and externals might reasonably be high frequency users (Lee et al., 2014; Park et al., 2013). Finally, besides testing each individual relationship as depicted in the theoretical model (i.e.: H₁–H₁₁), it seems more instructive to simplify this study to a single, overarching, definitive hypothesis. As such, we hypothesize that individuals with an

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